

**JUGHANDLE ESTATES (PWS 4430026)  
SOURCE WATER ASSESSMENT OPERATOR FINAL REPORT**

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**July 30, 2001**



**State of Idaho  
Department of Environmental Quality**

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Jughandle Estates, Lake Fork, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Jughandle Estates drinking water system consists of three ground water sources. Wells #1 and #2 are backup wells, disconnected from the system and are not considered in this report. Initially Well #2 is reported to have produced 18 gpm, but now only produces 3 gpm. Well #3 with a production rate of 75 gpm, has moderate contamination risk ratings for hydrologic sensitivity and a low risk rating for system construction. Even though there are no contaminant sources in the area and there have been no detections of contaminants, the highly porous characteristic of the weathered granite vadose zone led to an overall moderate susceptibility to all four categories covered in this report: Inorganic, volatile organic, synthetic organic and microbial contamination. Current water chemistry tests have recorded no significant problems with the well water, though the potential for contamination remains.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Jughandle Estates, source water protection activities should focus on implementation of best management practices aimed at protecting the wellhead and surface seals within the zone immediate to the well. The 1995 Sanitary Survey is due to be updated. Urban and residential runoff should be monitored. Spills and accidents from businesses or major transportation corridors within the jurisdiction of Jughandle Estates should be closely monitored and dealt with. Practices aimed at reducing the leaching of agricultural chemicals should be implemented. Disinfection practices should be implemented if microbial contamination becomes a concern. Most of the source water protection designated areas are outside the direct jurisdiction of the Jughandle Estates. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Boise Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# **SOURCE WATER ASSESSMENT FOR JUGHANDLE ESTATES, LAKE FORK, IDAHO**

## **Section 1. Introduction - Basis for Assessment**

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

### **Background**

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

### **Level of Accuracy and Purpose of the Assessment**

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## **Section 2. Conducting the Assessment**

### **General Description of the Source Water Quality**

The Jughandle Estates well is a community well serving approximately 200 people with approximately 59 connections. The well is located in Valley County, three miles east of Highway 55 and nine miles south, southeast of McCall (Figure 1). The public drinking water system for the Jughandle Estates is comprised of one well.

No significant water chemistry problems have been recorded at the wellhead. The inorganic contaminants (IOCs) beryllium, thallium, and nitrate have been detected, but at levels below the Maximum Contaminant Level (MCL). No detections of volatile organic contaminants (VOCs) or synthetic organic contaminants (SOCs) have been recorded. Total coliform bacteria and fecal coliform bacteria were detected in the distribution system in 1994, but no bacterial detections have occurred at the wellhead.

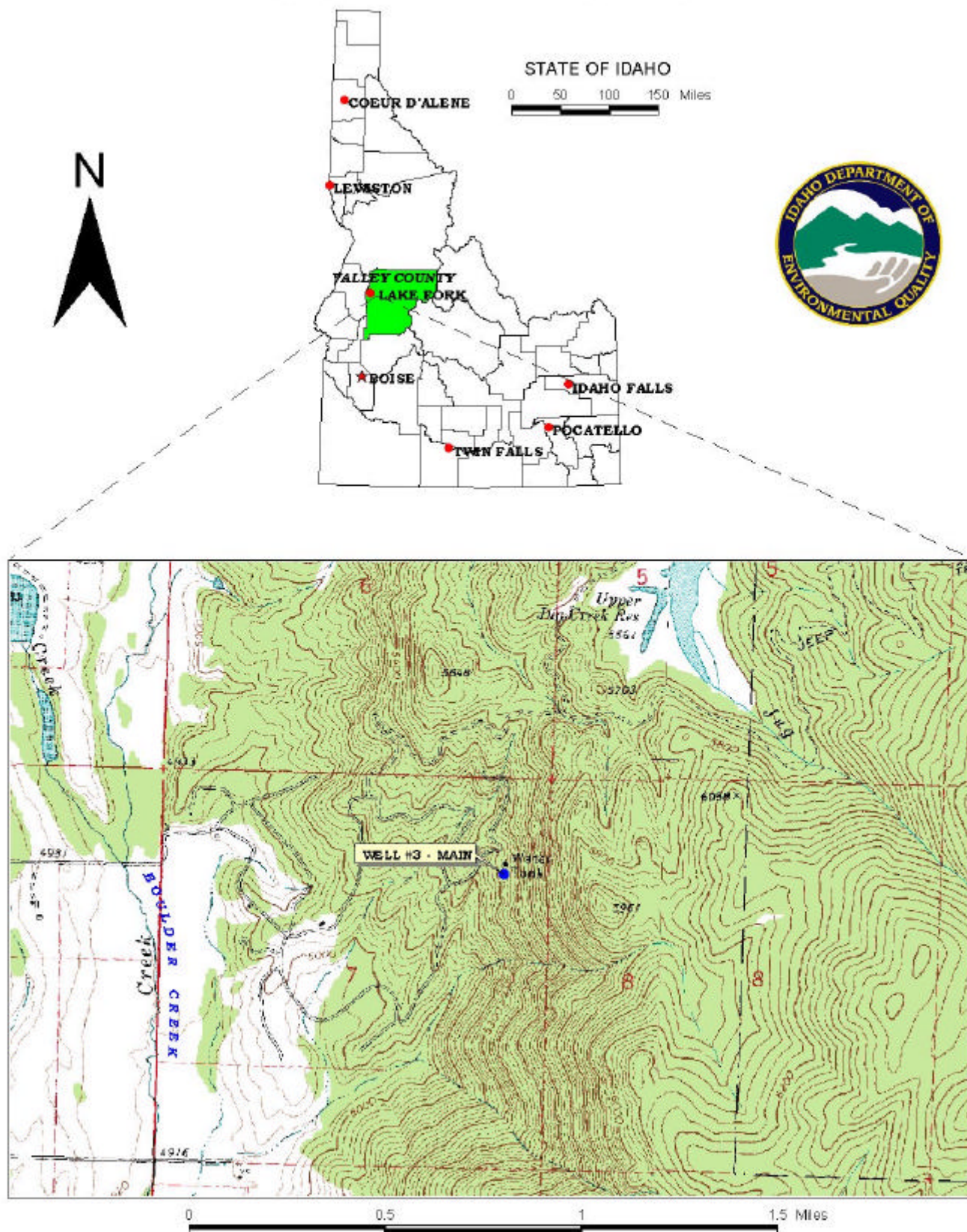
### **Defining the Zones of Contribution – Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Columbia River Basalt aquifer. The computer model used site specific data, assimilated by DEQ from a variety of sources including the Jughandle Estates well logs, other local area well logs, and hydrogeologic reports summarized below.

Well #3 of Jughandle Estates draws its water from the intrusive granitic Idaho Batholith. Typically ground water from the Idaho Batholith is of good quality but of low yield. Fractures (joints) within the granite are usually tight structures and occur in random directions except where major regional fault zones exist. There are no known major fault zones in the vicinity of Jughandle Estates. Groundwater transitivity in solid granite is rather low – usually in the range of 1 foot per day.

The delineated source water assessment area for Jughandle Estates Well #1 can best be described as a pair of circles stretched to the east for Zones 1B and 2. In situations where the capture zone delineation reaches the extent of the available aquifer, delineating the watershed captures the remainder of the contributed water (Zone 3) (Figure 2). The actual data used by DEQ in determining the source water assessment delineation areas are available upon request.

**FIGURE 1. Geographic Location of Jughandle Estates**



## **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

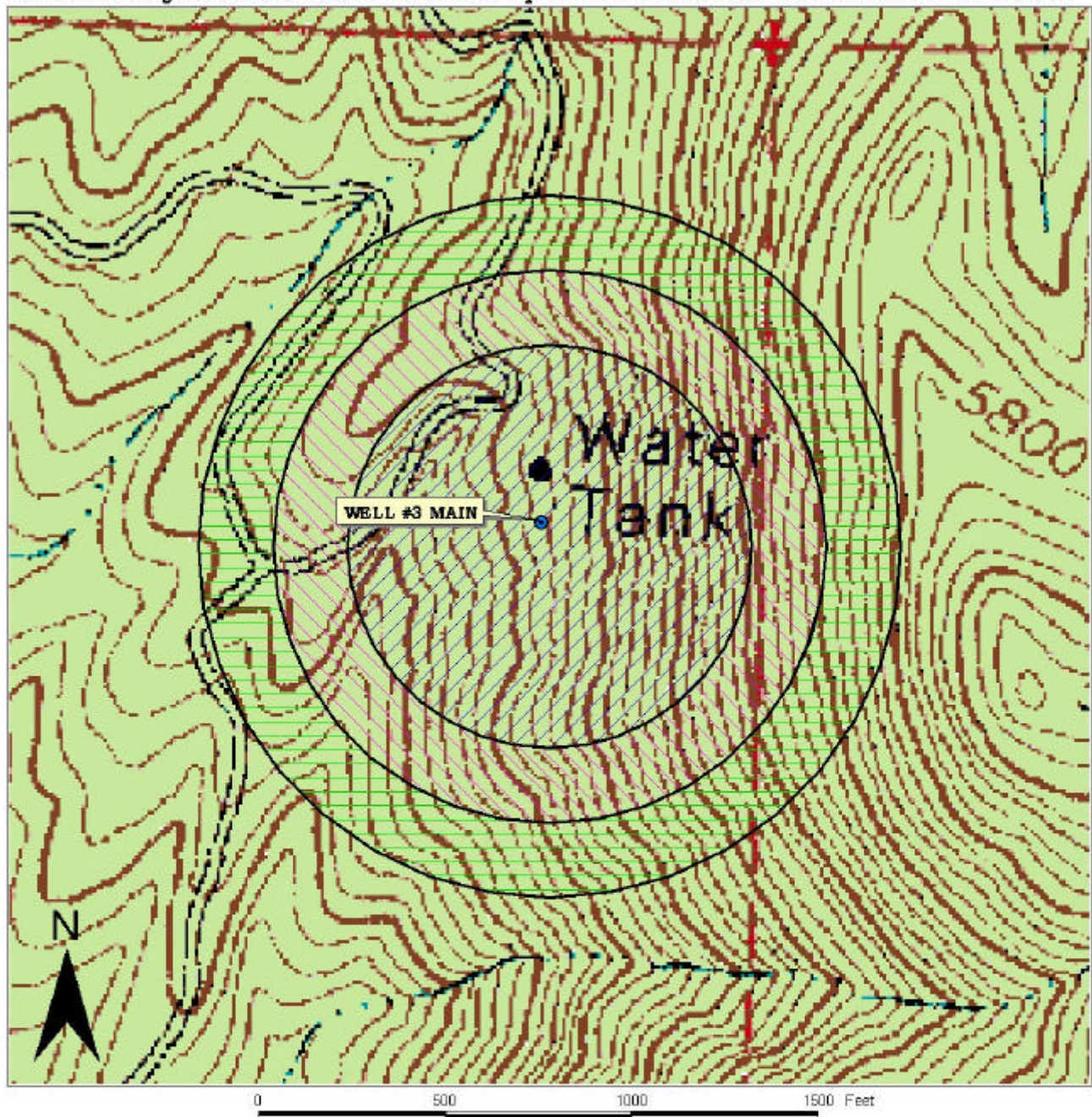
The dominant land use outside the Jughandle Estates area is timbered recreational lands with associated grazing with lower rangeland extending to the west. Land use within the immediate area of the wellheads consists of one residence and one septic tank. Highway 55, a major north/south transportation corridor is located four miles west of the subdivision.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination. These involve educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

## **Contaminant Source Inventory Process**

A two-phased contaminant inventory of the study area was conducted in February 2001. The first phase involved identifying and documenting potential contaminant sources within the Jughandle Estates Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Penny Dreyer. Figure 2 shows the locations of these various potential contaminant sites relative to the wellhead.

FIGURE 2. Jughandle Estates Delineation Map and Potential Contaminant Source Locations



**PWS# 4430026**  
**WELL #3-MAIN**

### **Section 3. Susceptibility Analyses**

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

#### **Hydrologic Sensitivity**

Hydrologic sensitivity was moderate for well #3 (Table 1). This reflects the nature of the soils being in the moderately to well drained class, the vadose zone (zone from land surface to the water table) being made predominantly of decomposed granite (sand) and the first ground water being located within 300 feet of ground surface. Additionally, the well does not have laterally extensive low permeability units that could retard downward movement of contaminants.

#### **Well Construction**

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The Jughandle Estates drinking water system consists of one functioning well that extracts ground water for residential uses. The well system construction score is low based on well log information.

A sanitary survey for the well was completed in September 1995 to determine if it was in compliance with State drinking water wellhead and surface seal standards. Information gathered during the sanitary survey indicated that the wellhead and surface seal were in compliance and the wellhead was protected from surface flooding. Well logs indicate that casing and annular seals had been extended into low permeability units and current public water system (PWS) construction standards are being met.

The IDWR Well Construction Standards Rules (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the Recommended Standards for Water Works (1997) during construction. Table 1 of the Recommended Standards for Water Works (1997) lists the required steel casing thickness for various diameter wells. Six-inch diameter casing on wells requires a casing thickness of at least 0.288-inches. The surface seal must be installed into a low permeability unit. No information was available about the depths of the surface seals.

#### **Potential Contaminant Sources and Land Use**

The well rated low for IOCs (i.e. nitrates), VOCs (i.e. petroleum products), and SOC (i.e. pesticides) and low for microbial contaminants. There are no commercial and agricultural land uses in the delineated source areas.

## Final Susceptibility Ranking

A detection above a drinking water standard MCL or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, the well rates moderate for IOCs and VOCs, and moderate for all other categories because of the moderate hydrologic sensitivity of the wellhead area.

**Table 1. Summary of Jughandle Estates Susceptibility Evaluation**

Well	Susceptibility Scores <sup>1</sup>									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #3	M	L	L	L	L	L	M	M	M	M

<sup>1</sup>H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,  
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

## Susceptibility Summary

No significant water chemistry problems have been recorded in the public water system. No detections of IOCs, VOCs or SOCs have been recorded. Though the delivered water is currently safe and the current environment is good, there is the potential for contamination from the local point sources due the porous conditions in the vadose zone around well #3. This vulnerability is inherent to the decomposed granite geologic environment around Jughandle Estates.

## Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Jughandle Estates, source water protection activities should focus on implementation of best management practices aimed at protecting the wellhead and surface seal within the zone immediate to the well. Residential runoff should be monitored. Spills and accidents from homeowners within Jughandle Estates should be closely monitored and dealt with. Disinfection

practices should be implemented if microbial contamination becomes a concern. Some of the designated source water protection area is outside the direct jurisdiction of the Jughandle Estates. Partnerships with state and local agencies and homeowners should be established and are critical to success. Continued vigilance in keeping the well protected from surface flooding can also keep the potential for contamination reduced. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

## **Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office                      (208) 373-0550

State DEQ Office                                      (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 743-6142 for assistance with wellhead protection strategies.

## POTENTIAL CONTAMINANT INVENTORY

### LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with aboveground storage tanks.

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

## References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho State Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Administration, 1966. Groundwater conditions in Idaho. Water Information Bulletin No. 1.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Water Resource Board, 1973. Comprehensive Rural Water and Sewerage Planning Study for Washington County. U.S. Geological Survey (prepared in cooperation with University of Idaho, Washington State University and the cities of Moscow, Idaho and Pullman, Washington), Water Resources Investigations Report 89-4103, 73 p.

Lum II, W.E., J.L. Smoot, and D.R. Ralston, 1990. Geohydrology and Numerical Model Analysis of Ground-water Flow in the Pullman-Moscow Area, Washington and Idaho.

Parlman, D.J. 1986. "Quality of Groundwater in the Payette River Basin, Idaho." USGS Water-Resources Investigations Report 86-4013.

Schmidt, D. L. and Mackin, J. H. 1970. Quaternary Geology of Long and Bear Valleys, West-Central Idaho." Geologic Survey Bulletin 1311-A.

Whitehead, R.L. and D.J. Parlman, 1979. A Proposed Ground Water Quality Monitoring Network for Idaho. U.S. Geological Survey (prepared in cooperation with Idaho Department of Health and Welfare, Division of Environment), Water Resources Investigations, Open-File Report 79-1477, 67 p.

Wood, S. H. 1990. "Groundwater Supply for the Proposed Valbois Destination Resort Valley County, Idaho and Comments on the Regional Groundwater Hydrology." Report prepared for Valbois Incorporated.

Attachment A  
Jughandle Estates  
Susceptibility Analysis  
Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

**Ground Water Susceptibility Report Public Water System**  
**JUGHANDLE ESTATES, WELL #3, Number 4430026**

1. System Construction		SCORE			
	Drill Date				
	Driller Log Available	NO			
	Sanitary Survey (if yes, indicate date of last survey)	NO		0	
	Well meets IDWR construction standards	NO		1	
	Wellhead and surface seal maintained	NO		1	
	Casing and annular seal extend to low permeability unit	NO		2	
	Highest production 100 feet below static water level	NO		1	
	Well located outside the 100 year flood plain	NO		1	
Total System Construction Score				0	
2. Hydrologic Sensitivity					
	Soils are poorly to moderately drained	NO		2	
	Vadose zone composed of gravel, fractured rock or unknown	YES		1	
	Depth to first water > 300 feet	NO		1	
	Aquitard present with > 50 feet cumulative thickness	NO		2	
Total Hydrologic Score				6	
3. Potential Contaminant / Land Use - ZONE 1A			IOC Score	VOC Score	SOC Score
	Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0
	Farm chemical use high	NO	0	0	0
	IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A			0	0	0
Potential Contaminant / Land Use - ZONE 1B					
	Contaminant sources present (Number of Sources)	NO	0	0	0
	(Score = # Sources X 2 ) 8 Points Maximum		0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	0
	4 Points Maximum		0	0	0
	Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0
	Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B			0	0	0
Potential Contaminant / Land Use - ZONE II					
	Contaminant Sources Present	NO	0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	0
	Land Use Zone II	Less than 25% Agricultural Land	0	0	0
Potential Contaminant Source / Land Use Score - Zone II			0	0	0
Potential Contaminant / Land Use - ZONE III					
	Contaminant Source Present	NO	0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	0
	Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone III			0	0	0
Cumulative Potential Contaminant / Land Use Score			0	0	0
4. Final Susceptibility Source Score			6	6	6
5. Final Well Ranking			Moderate	Moderate	Moderate